Food safety in low and middle income countries

Risky Business: Food Safety Concerns in Agricultural Development

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estock Research Institute

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CGIAR | Research Program on Nutrition and Health

FOOD SAFE

COUNTRIES

A learning resource fo

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CLIMATE
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FOOD SAFETY AND INFORMAL MARKETS

Animal Products in Sub-Saharan Africa

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lle Income Countries

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ase (FBD) in low and middle income countries
nt studies in recent years have broadened our
eloping country consumers are concerned about
FBD disease comes from biological hazards; and,
ption of fresh, perishable foods sold in informal
LMICs as the result of massive increases in the
d fish products and produce) and lengthening and
ification of agricultural production is a strong trend,
dern retail have not demonstrated clear advantages
e is limited evidence on effective, sustainable and
safety in domestic markets. Training farmers on
its those farmers trained, but has not been scalable
tices are linked to eligibility for export. Training
e business benefits from being trained has been
owing public concern and increased emphasis on
e food safety.

health burden

ssue. The full health effects, as well as the full economic
e global impact on health, trade, and development is

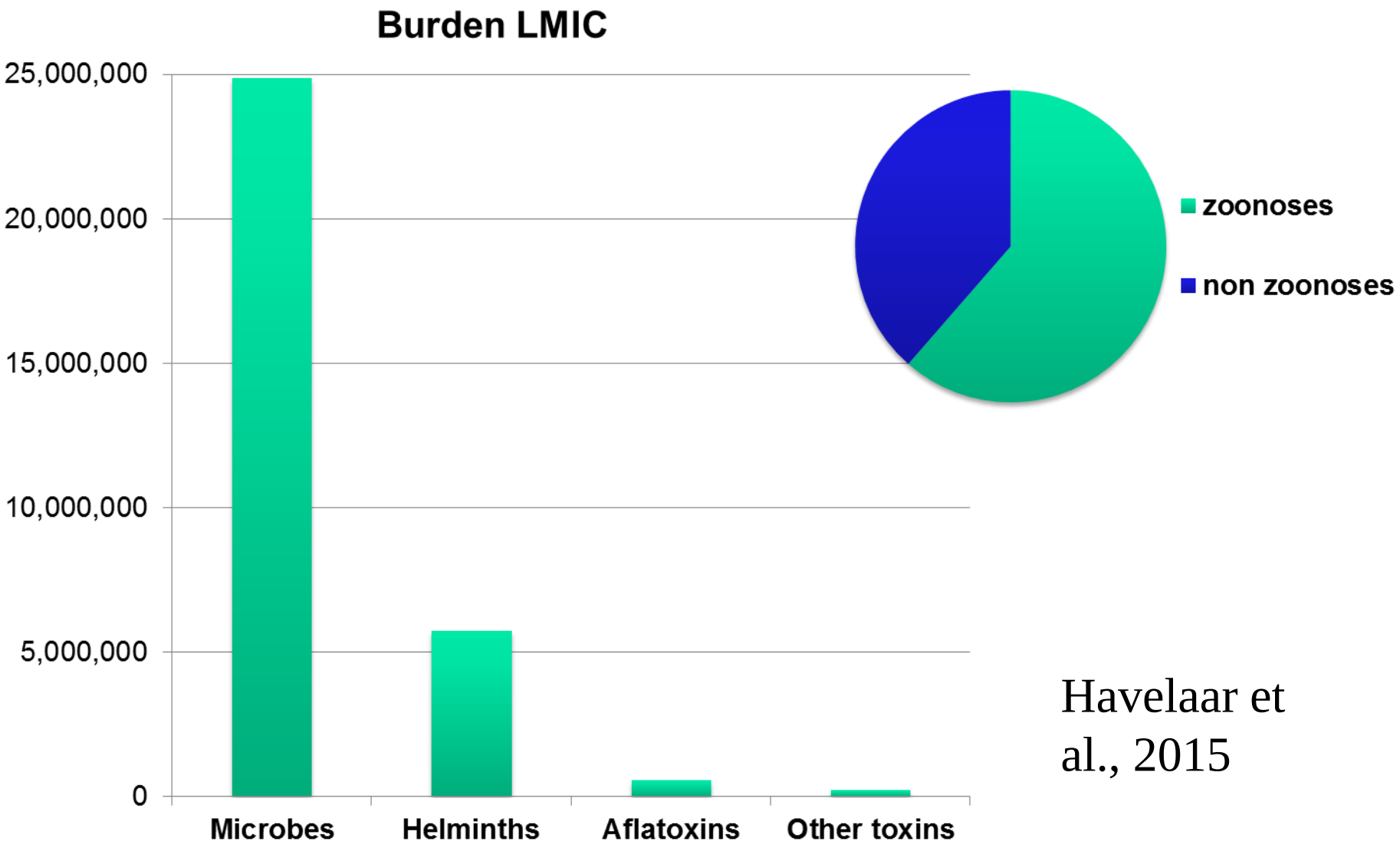
Overview

- Why food safety matters for development
- Food safety solutions
- Evidence gaps and take home messages

Foodborne disease matters for development

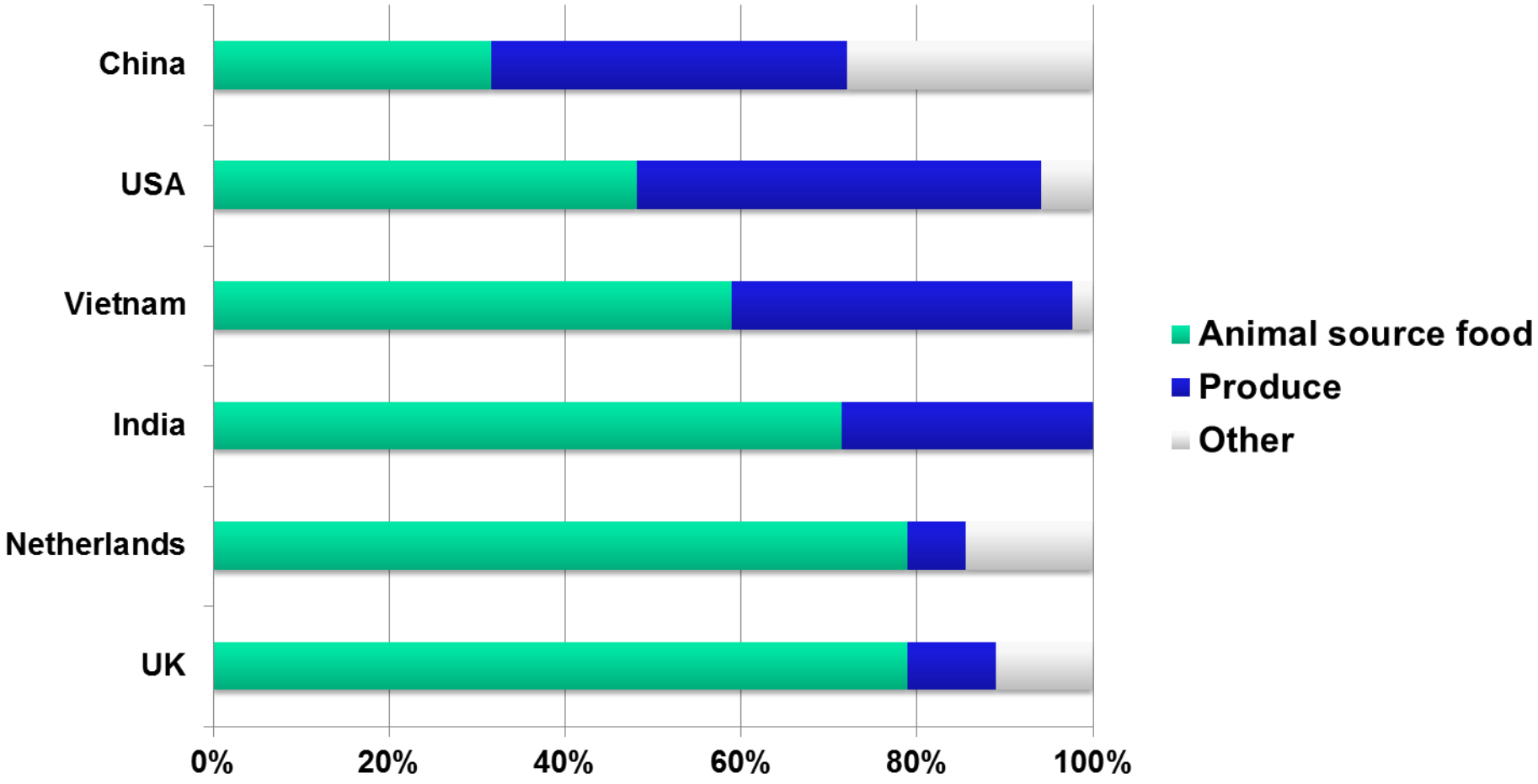
- **High health burden**: The huge health burden of FBD is borne mainly by developing countries
- **High concern**: Developing country consumers show high concern over FBD
- **High cost**: costs of disease and market access
- **High risk of un-intended consequences** of conventional approaches to improving food safety in informal markets

Causes of FBD

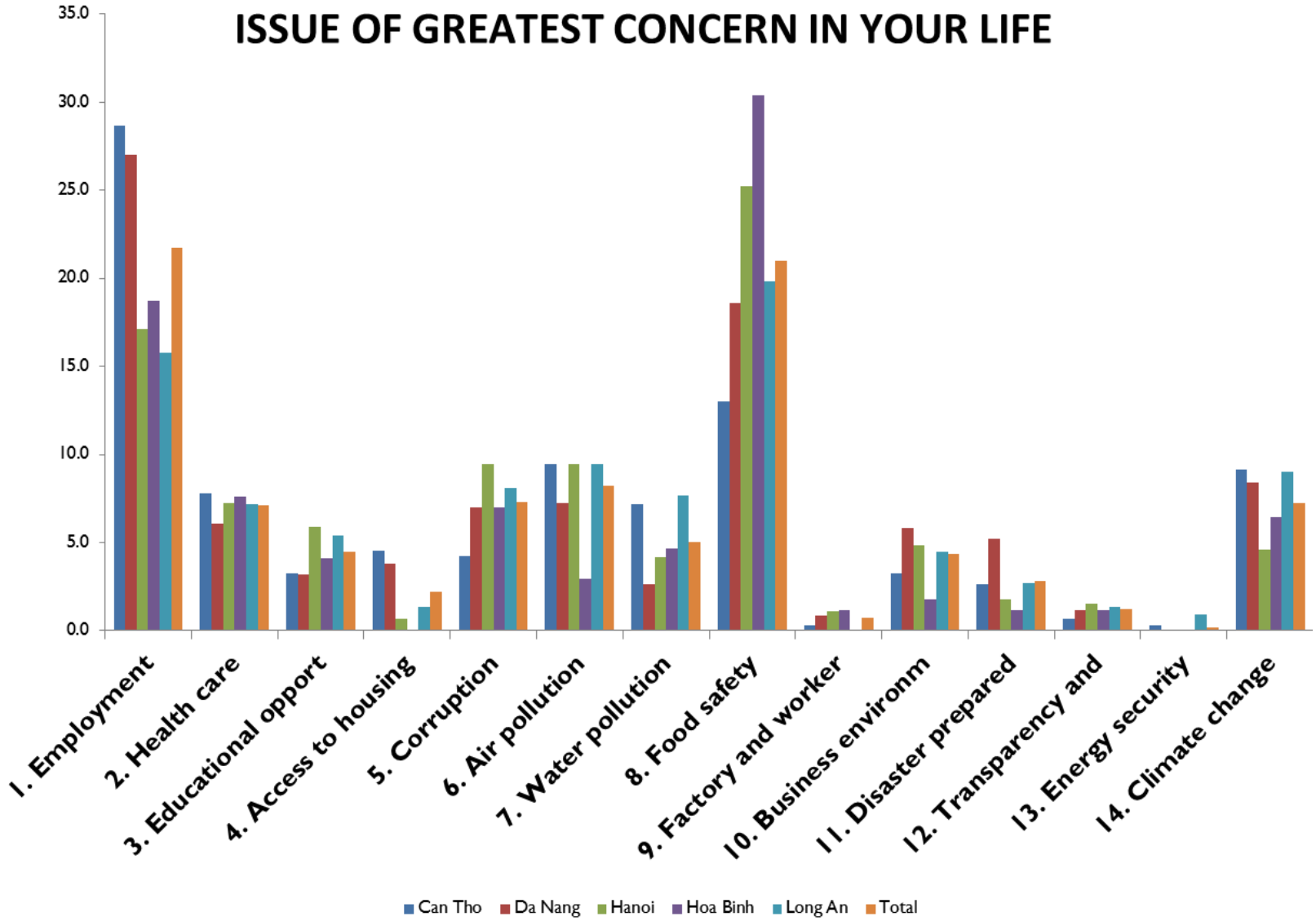


Havelaar et al., 2015

Foods implicated in FBD



Painter et al., 2013, Sudershan et al., 2014, Mangan et al., 2014; Tam et al., 2014; Sang et al., 2014 ; ILRI, 2016



USAID, NATIONAL OPINION SURVEY VIETNAM 2015

Economic costs: cost of FBD and market access

- Cost of illness: USA over $15 billion annually (Hoffmann 2015);
  - Australia $0.5 -$2 billion per year (Abelson P 2006).
  - Vietnam: hospitalisation for FBD $6 million a year (Hoang, 2015)
  - Nigeria: $3.6 billion (Grace, 2012)

- Food safety standards often exclude small firms and farms from export markets
  - Kenya and Uganda saw major declines (60% and 40%) in small farmers participating in export of fruit and vegetables to Europe under Global GAP
- Farmers supplying supermarkets are richer, better educated, more likely to be male and located near cities

Un-intended consequences: nutrition and health

Benefits of wet markets

Cheap,
Fresh,
Local breeds,
Accessible,
Small amounts
Sellers are trusted,
Credit may be provided

(results from PRAs with consumers in Safe Food, Fair Food project)

	Wet market milk	Supermarket milk
Most common price /litre	56 cents	One dollar
Infants consume daily	67%	65%
Boil milk	99%	79%

- When markets differentiate by quality, substandard food is targeted to the poor

Un-intended consequences: Food safety & livelihoods

Milk (cow) Production: men (x Nairobi) Processing: women Marketing: women (x Abidjan) Consumed: both	**Milk (goat)** Production: men (w milk) Processing: women Marketing: women Consumed: both
Beef/goat Production: men (w assist) Processing: men Marketing: men (butcher,pub) Consumed: both	**Poultry** Production: women Processing: women Marketing: women Consumed: both
Pigs Production: women Processing: men Marketing: men Consumed: both	**Fish, crabs** Fishing: men Processing: women Marketing: women) Consumed: both

Overview

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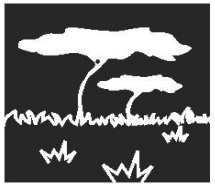
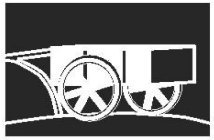
Can we regulate our way to food safety?

- **100%** of milk in Assam doesn't meet standards
- **98%** of beef in Ibadan, **52%** pork in Ha Noi, unacceptable bacteria counts
- **92%** of Addis milk and **46%** of Nairobi milk had aflatoxins over EU standards
- **36%** of farmed fish from Kafrelsheikh exceed one or more MPL
- **30%** of chicken from commercial broilers in Pretoria unacceptable for *S. aureus*
- **24%** of boiled milk in Abidjan unacceptable *S. aureus*

Risk mitigation

Average of 17.25 risk mitigation strategies used

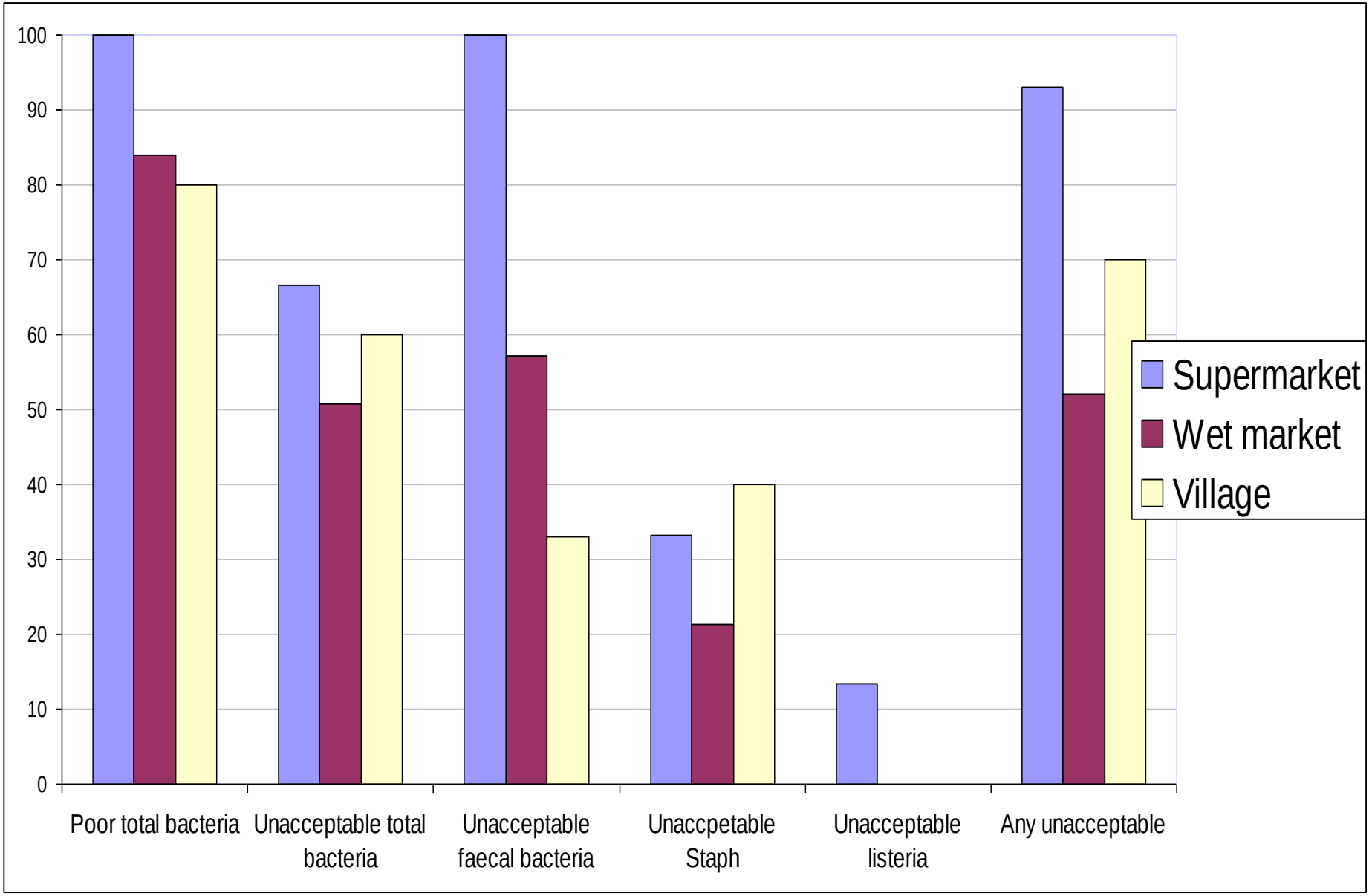
Farmers who believed UA was legal used more strategies

Hazard Transmission		Risk mitigation strategies currently practiced (%)			
	Ecosystem to cow	Keep only one species	29%	Treat cattle often	31%
		Zero-graze	38	Don't keep calves	39
		Use own land only for feed	41	Use Artificial insemination	44
		Avoid common grazing	56	Vaccinate against brucellosis	1
		Keep local breeds	27		
	Milk shed to cow	Use feed/water trough	94	Stack manure	11
		Have concrete/stone floor	96	Have a waste disposal strategy	96
		Use bedding	41		
	Milk shed / dairy to milk	Have washable shed wall	100	Use just metal/ glass vessels	19
		Have metal/tin roof	96	Use piped water	75
		Store containers off floor	29	Keep premises clean	51
		Keep milk bar dry	45	Depose waste >5m away	38
	Milk handler to milk	Use hot water to clean	18	Have no discharges/ wounds	97
		Use soap to clean	81	Have clean hands	79
		Wear protective clothing	1	Have clean/short nails	81
		Wash hands with soap before handling milk	59	Access to latrine	98
				Good personal hygiene	49
	Transport to milk	Don't drink unsold milk	10	Don't sell/store unsold milk	90
	Milk to consumer	Treat milk	50	Sell milk quickly (=6 hrs)	82
		Avoid drinking raw milk	93	Don't consume milk until withdrawal period passed	64
		Check milk quality by smell/taste	48		

Can we modernise our way to food safety?

- Supermarketisation is slower than thought.
- Formal sector food is risker than thought.
- Modern business models have often run into problems
  - *Co-ops, abattoirs, market upgrades*

Formal worse than informal



Will GAP get us safe food?

- Smallholders have been successfully integrated into export chains
- Small scale pilots show short term improvements
- But domestic GAP has limited reach and limited impact
  - In 4 years VietGAP reached 0.06%
  - In Thailand GAP farmers have no better pesticide use than non-GAP farmers
  - FFS systematic review: farmer field schools could be used selectively to solve particular problems in particular contexts, but are not useful to solve large-scale problems.

Participatory Risk Analysis

Hazards are high, but risk area variable

Fail standards: bacteria

- 100% milk in Assam, India
- 98% of raw meat in Ibadan, Nigeria
- 94% of pork in Nagaland, India
- 77% farmed fish in Egypt

Fail standards: chemical

- 92% milk in Addis Ababa
- 46% milk in Kenya

Diarrhoea in last 2 weeks

- 0.02% consumers in Canada
- 0.02% raw milk buyers in Kenya
- 23% consumers in Nagaland
- 43% Nigerian butchers

Improvements are feasible, effective, affordable

- Peer training, branding, innovation for Nigerian butchers led to 20% more meat samples meeting standards; cost $9 per butcher but resulted in savings $780/per butcher per year from reduced cost of human illness

- Providing information on rational drug use to farmers, led to four-fold knowledge increase, two-fold improvement in practice and halving in disease incidence

- Branding & certification of milk vendors in Kenya & Guwahti, Assam led to improved milk safety.
- It benefited the national economy by $33 million per year in Kenya and $6 million in Assam
- 70% of traders in Assam and 24% in Kenya are currently registered
- 6 million consumers in Kenya and 1.5 million in Assam are benefiting from safer milk

ILRI CGIAR

Take home messages

- FBD is important for health and development
- Most is due to microbes & worms in fresh foods sold in wet markets
- Hazards in wet markets are always high but risks are sometimes low and perception is a poor guide
- Control & command approaches don't work but solutions based on working with the informal sector more promising

Acknowledgements

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